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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,353	11/25/2003	Ramachandra Divakaruni	FIS920000227US2	4734
29505	7590	07/11/2006	EXAMINER	
DELIO & PETERSON, LLC 121 WHITNEY AVENUE NEW HAVEN, CT 06510			ERDEM, FAZLI	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/722,353

Applicant(s)

DIVAKARUNI ET AL.

Examiner

Fazli Erdem

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-36 and 38-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-30 is/are allowed.
- 6) ☒ Claim(s) 31, 32, 35, 36, 38 and 39 is/are rejected.
- 7) ☒ Claim(s) 33, 34 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Examiner's Comment

1. Examiner would like to see non-patent literature/other art that was filed part of the IDS of 11/25/2003. The three non-patent literature/other art entries were not filed with the current application.

Allowable Subject Matter

1. Claims 21-30 allowed.
2. Claims 33, 34 and 40 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 31, 32, 35, 36, 38 and 39 rejected under 35 U.S.C. 103(a) as being unpatentable over Chung (6,548,374) in view of Schrems et al. (6,465,370) further in view of Burns JR, et al. (5,874,760)

Regarding Claims 31, 32, 35, 38 and 39, Chung discloses a method of self-aligned shallow trench isolation and method of manufacturing non-volatile memory device comprising the same where in Fig. 3D, it is disclosed a semiconductor substrate 100, a

plurality of adjacent trenches 109 in semiconductor substrate, a plurality of adjacent segments of semiconductor substrate between each of plurality of adjacent trenches, an oxidation barrier layer 111 residing in lower portions of plurality of adjacent trenches 109 and a self-aligned shallow trench isolation comprising merged section of selected ones of plurality of adjacent segments of semiconductor substrate along a first row above the oxidation barrier layer 111.

Chung fails to disclose the required configuration where self-aligned isolation structure is on the upper part of the trench and the barrier layer on the lower portions of the trench and the required depth for the trenches. However, Schrems et al. disclose a low-leakage low capacitance isolation material where in Fig. 6B, isolation structure 56A is located on the upper portions of the trench and the barrier layer 44 is on the lower portion of the trench. Furthermore, Burns, JR. et al. disclose a 4F-Square memory cell having vertical floating-gate transistors with self-aligned shallow trench isolation where in columns 9 and 10 and in Fig. 8, trenches 210 have depth between 300nm and 500 nm.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required self aligned isolation structure on the top portion of the trench and the barrier layer in the lower portion of the trench in Chung as taught by Schrems et al. in order to have a semiconductor memory device with increased reliability.

Regarding Claim 32 the semiconductor substrate is silicon

Regarding Claim 35, 38 and 39, barrier layer could be one of oxide, silicon oxynitride, silicon nitride or thermal oxide.

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Regarding Claim 36, in Fig. 60 of Burns, JR. et al., barrier layer 900 have a thickness of 40 nm.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (571) 272-1914. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

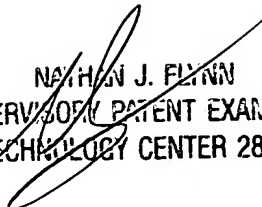
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